



City of Redmond Crosswalk Site Review Worksheet

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November 16, 2016

1) Reviewer (name, firm, title, and signature)

Jeffrey P. K. Hee, PE
Transportation Solutions, Inc. (TSI)
Project Engineer

2) Location (address, approximate cross streets, landmarks)

The proposed crossing location is on NE 76th Street between 185th Ave NE and 188th Ave NE. The proposed crossing is located to the west side of an existing driveway, on the south side of the road. The existing driveway is restricted to right turns in and right turn out by an existing center landscaped median. The driveway will provide future access to new development on the Union Hill Corporate Center, including the proposed Lot 4 (Union Hill Self-Storage & Costco Employee Parking). A vicinity map (Attachment 1) and a site plan (Attachment 2) are attached for reference highlighting the proposed crossing location.

3) Contact (person or group requesting this review)

Applicant: Robert Power, Union Hill Self-Storage LLC
Contact: Jeff Hee, TSI at 425-883-4134

4) Describe the suspected nature of problem, or the purpose of review

The Applicant is proposing to provide a marked crosswalk on NE 76th Street to support Costco employees crossing the street between the proposed Costco Employee Parking, located on the south side of NE 76th Street, and the Costco Wholesale Membership Warehouse, which is currently under construction on the north side of NE 76th Street.

5) Date(s) this Review was Conducted

July 26-August 12, 2016

6) Functional Classification (see current COR Transportation Master Plan)

NE 76th Street is classified by the city as a Collector Arterial.

7) Distance Between Crossings (existing and proposed marked and unmarked crossings)

Existing marked crossing locations are located at the 185th Ave NE and 188th Ave NE intersections. The existing intersections are approximately 910-feet apart. The proposed crossing location is on the west side of a proposed private right-in/right-out driveway. The crossing location is approximately 565-feet east of 185th Ave NE and 345-feet west of 188th Ave NE. Costco's NE 76th Street access is located about 245-feet west of the proposed crossing location.

8) Illumination (pole numbers, locations, height and wattage of luminaires)

Attachment 3 includes the photometric analysis related to the proposed crossing midblock location. Table 1 summarizes the photometric analysis findings.

Table 1: NE 76th Street Crosswalk Photometric Analysis Results

Area	Average (foot-candles)		Uniformity (Avg./Min.)		Okay?
	Proposed	Standard	Proposed	Standard	
Proposed NE 76th Street Crosswalk	1.21	1.00	1.10	3.00	Yes
NE 76th Street Roadway	1.11	1.10	2.22	3.00	Yes

With new development the existing high pressure sodium (HPS) streetlight fixtures would need to be changed out to light emitting diode (LED) fixtures. The photometric analysis shows that the existing light locations on NE 76th Street are reasonable to support the crossing location, with new LED fixtures.

9) Describe Topography (flat, rolling, vertical curves, horizontal curves)

NE 76th Street slopes downward-westward to 185th Ave NE and flattens out at the right-in/right-out driveway to 188th Ave NE at the proposed crossing location.



10) Vegetation (trees or shrubs that affect crossing site, signage, signals or lighting)

The proposed crossing would require modification of the current center landscaped median on NE 76th Street. With a center pedestrian refuge proposed, to support two stage crossing of NE 76th Street, the landscaping within the median would need to be trimmed or replanted to 18" high or removed completely. Landscaping along the road's outside edges and the street lighting locations do not significantly impact the available sightlines at the proposed crossing location.

Per feedback from Redmond staff, the hardscaped pedestrian refuge area will be cleared of vegetation and for a width of 20 feet on each side of the midblock crossing area.

11) Accessibility under ADA (entire crossing facility including existing or proposed ramps)

Yes, the proposed facility (including the curb ramps and pedestrian refuge area) will be designed to meet ADA guidelines.

12) Current Traffic Control (signals, beacons, stop or yield signs, uncontrolled)

Currently there is no traffic control currently provided at the crossing location.

The existing landscaped center median fronting the driveway for Lot 4 restricts the driveway to right turn-in and right turn-out only. As stated above the Costco driveway on NE 76th Street is about 245-feet, measured from the near side of the driveway to the proposed crossing, west of the proposed crossing.

13) Conflicting Attention Demands (visual distractions, clutter, activities, increased visual load)

Cadman trucks and Costco and FedEx delivery vehicles will be on the roadway; however, these vehicles are not assumed to significantly deter a person's from wanting to cross the roadway.

14) Designated Truck Route? (RMC Chapter 10.76). Designated Transit Route? (METRO, Sound Transit).

NE 76th Street is not a designated Truck Route. Neither 188th Ave NE or NE 76th Street in the immediate area are designated as Transit Routes.

15) Other Risk Factors (children, elderly, school zone, special needs populations, etc.)

None

16) Peak Pedestrian and Bicycle Volume at Crossing (using durations shown in COR Hierarchy of Crossing Treatments graphic)

The peak pedestrian crossing volume will occur in the early mornings and is tied Costco employees shift schedules. Based on review of other local warehouse sites, the peak employee shifts, in terms of number of employees, occurs between 4 AM and 10 AM. Within this period, it is estimated that a total of 115 employees will arrive and depart the warehouse, with a majority arriving around 4 AM and then again arriving at 9 AM.

Data obtained from Costco warehouse management indicated that based on other local warehouses, the peak one-hour Costco employee crossing volume is 35 pedestrians between 4 AM and 5 AM.

- The peak hour employee crossing volume is greater than 20 crossings per hour. This satisfies Redmond's *Hierarchy of Crossing Treatments* (updated December 1, 2011) criteria for consideration of a marked crosswalk.
- If Costco were to open up the "employee parking" for non-employees, then the pedestrian volumes may reach 40 crossings for any 2 hours of a given day. This condition satisfies Redmond's criteria for consideration of marked crosswalk with a flashing beacon-feature.
- The peak hour crossing volumes are not anticipated to reach a level that would warrant considerations for a traffic signal.



17) Motor Vehicle Volume (for same periods as item above)

The peak motor vehicle volume at 4 AM is projected at 50-150 vehicles per hour.

During the PM peak hour (4-6 PM) motor vehicle volumes are projected at 1,200 vehicles. The peak hour pedestrian crossing volume during that same time period is projected at about 20 pedestrians.

18) Gaps (estimated number of "peak hour" traffic pedestrian crossing gaps). Use the same period as in item 16, MUTCD designated walk speed, and crossing length, to calculate.

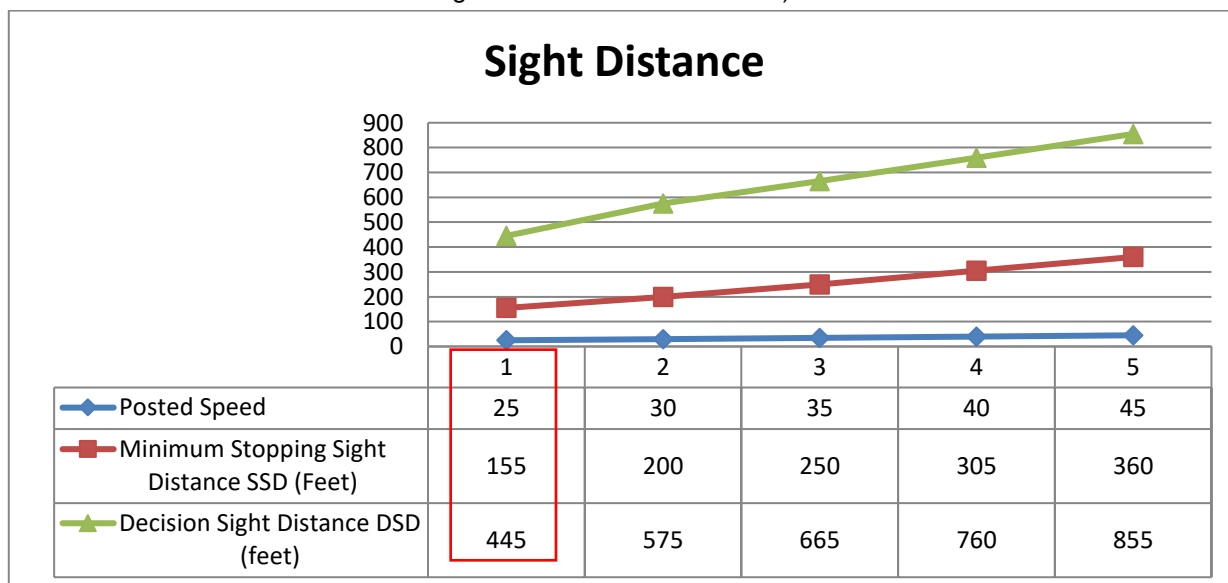
		PM Peak Hour ¹	Peak Crossing Hour ²
Scenario 1: Cross eastbound travel lane only	<ul style="list-style-type: none"> Width Ped. Speed Ped. Gap Design Volume $P(h \geq 4 \text{ seconds})^3$ No. of 4 sec. Gaps 	<ul style="list-style-type: none"> 1 lane / 16 feet 4 fps 4 seconds 500 vph / 0.139 vps 57.37% 287 gaps 	<ul style="list-style-type: none"> 1 lane / 16 feet 4 fps 4 seconds 90 vph / 0.025 vps 90.48% 81 gaps
Scenario 2: Cross westbound travel lane only	<ul style="list-style-type: none"> Width Ped. Speed Ped. Gap Design Volume $P(h \geq 4 \text{ seconds})^3$ No. of 4 sec. Gaps 	<ul style="list-style-type: none"> 1 lane / 16 feet 4 fps 4 seconds 700 vph / 0.194 vps 45.94% 321 gaps 	<ul style="list-style-type: none"> 1 lane / 16 feet 4 fps 4 seconds 60 vph / 0.017 vps 93.55% 56 gaps
Scenario 3: Cross Full Width of NE 76th Street	<ul style="list-style-type: none"> Width Ped. Speed Ped. Gap Design Volume $P(h \geq 11 \text{ seconds})^3$ No. of 4 sec. Gaps 	<ul style="list-style-type: none"> 2 lane / 44 feet 4 fps 11 seconds 1,200 vph / 0.333 vps 2.56% 30 gaps 	<ul style="list-style-type: none"> 2 lane / 44 feet 4 fps 11 seconds 150 vph / 0.042 vps 63.23% 95 gaps

1. PM Peak Hour Volumes (4-5 PM)

2. Peak Crossing Hour (4-5 AM) corresponding to information from Costco about employee shifts

3. Probability of a headway greater than or equal to ____ second gap
 $P(h \geq \text{gap}) = \text{EXP}^{-qt}$

19) Sight Distance (DSD & SSD shall be determined using a driver eye-height of 3.5 feet and an object-height of 0.5 feet. An object height of two feet may be considered on a case-by-case basis for existing streets. Distances measured along the centerline of the street).



Redmond staff indicated that the legal speed on NE 76th Street is 25 mph. The current speed limit sign on NE 76th Street, is incorrectly posted at 35 mph. The following analysis is based on a 25 mph posted speed limit, as advised by Redmond staff (9/1/2016).



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Sight distance requirements are highlighted in the above table. Attachment 4 shows the field measured sightlines. Table 2 summarizes the sight distance measures. Overall the sightlines are sufficient.

Table 2: Sight Distance Field Measures

Location (Looking)	Sightline Measure (ft.)	Stopping Sight Distance (ft.)		Decision Sight Distance (ft.)	
		Required	Okay?	Required	Okay?
A (Eastbound)	740	155	Yes	445	Yes
B (Westbound)	470	155	Yes	445	Yes

20) Posted Speed Limit; and 85th Percentile Speed

As indicated above, the regulatory speed limit on NE 76th Street is 25 mph; however, the posted speed between 185th Ave NE and 188th Ave NE is 35 mph. A speed study was performed at the proposed crossing location on NE 76th Street on Wednesday, July 27, 2016 by IDAX. Data collection was coordinated with Costco, Ferguson (general contractor on Costco's site) and Cadman. A copy of the speed study in attached (Attachment 5). Summary:

- Median Speed: 36.5 mph eastbound / 33.7 mph westbound
- 85th Percentile: 41.7 mph eastbound / 38.9 mph westbound

We assume that when changed at 25 mph, the vehicle speeds in this area will be reduced. We also assume that as Costco and other development fill in this area, the additional congestion will help to lower the median and 85th percentile speeds on NE 76th Street.

21) Collision History (most current three-year period)

A crash history was obtained from WSDOT on NE 76th Street from 185th Ave NE to 188th Ave NE between 2013 and 2015. The crash history is provided in Table 3 and are summarized below:

- Seven total crashes reported: one with a possible injury and six with property damage only.
- No crashes were reported in 2013, which is consistent with NE 76th Street being incomplete.
- The resulting crash rate is 3.5 crashes per year (2-year period).
- No crashes were reported on NE 76th Street between 185th Ave NE and 188th Ave NE.
- Of the reported crashes, none involved pedestrians or pedal-cyclists.

Table 3: 2013-2015 Crash History on NE 76th Street (185th Ave to 188th Ave)

Location	Year	Time	Injury?	Veh. ¹	Surf. Cond. ²	Lighting ³	Crash Type	Action of Vehicle 1	Action of Vehicle 2	Contributing Factor
185th Ave at NE 76th	2015	16:35	No	2	Wet	DSL ON	Entering at Angle	Going straight ahead	Making left turn	Speeding
	2015	17:56	Possible	2	Wet	DSL ON	Entering at Angle	Starting in traffic lane	Going straight ahead	Did not grant R/W
NE 76th at 185th Ave	2014	10:21	No	2	Dry	Daylight	Sideswipe	Making right turn	Stopped at stop sign	Inattention
	2014	14:23	No	2	Wet	Daylight	Entering at Angle	Going straight ahead	Going straight ahead	Disregard stop sign
188th Ave at NE 76th	2014	10:30	No	2	Wet	Daylight	Entering at Angle	Going straight ahead	Going straight ahead	Driver distracted
	2015	18:09	No	2	Dry	Daylight	Entering at Angle	Making left turn	Going straight ahead	Inattention
	2015	12:29	No	2	Dry	Daylight	Entering at Angle	Going straight ahead	Going straight ahead	Other (Inattention)

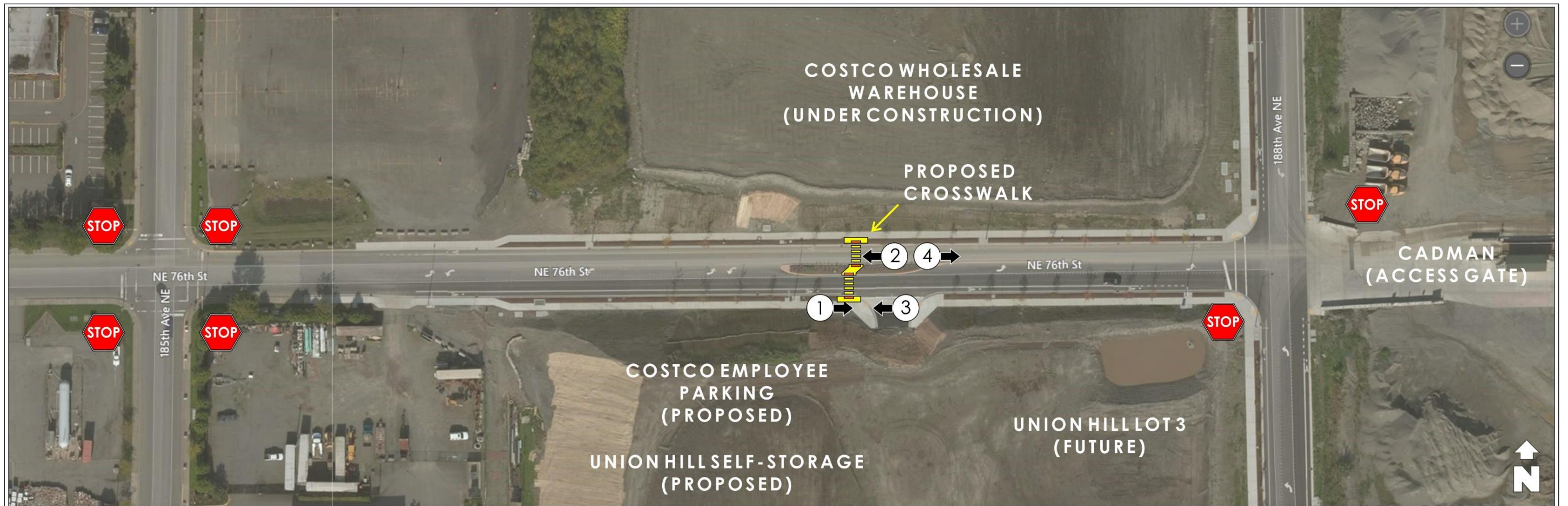
1. Number of vehicles

2. Surface pavement condition

3. Lighting conditions (DSL ON = dark street lights on)

22) Notes and Brainstorming of Potential Treatment Options

Based on the traffic volumes, modifying the center median with a pedestrian refuge area was seen as a reasonable crossing option. The median provides a physical barrier to retain right-in and right-out driveway access and the design supports a transition to extend the left turn pocket at 188th Ave NE. The crossing location supports the Costco employee parking and provides employees with access to the



Attachment 1: VICINITY MAP
NE 76th Street Proposed Pedestrian Crossing

Legend:

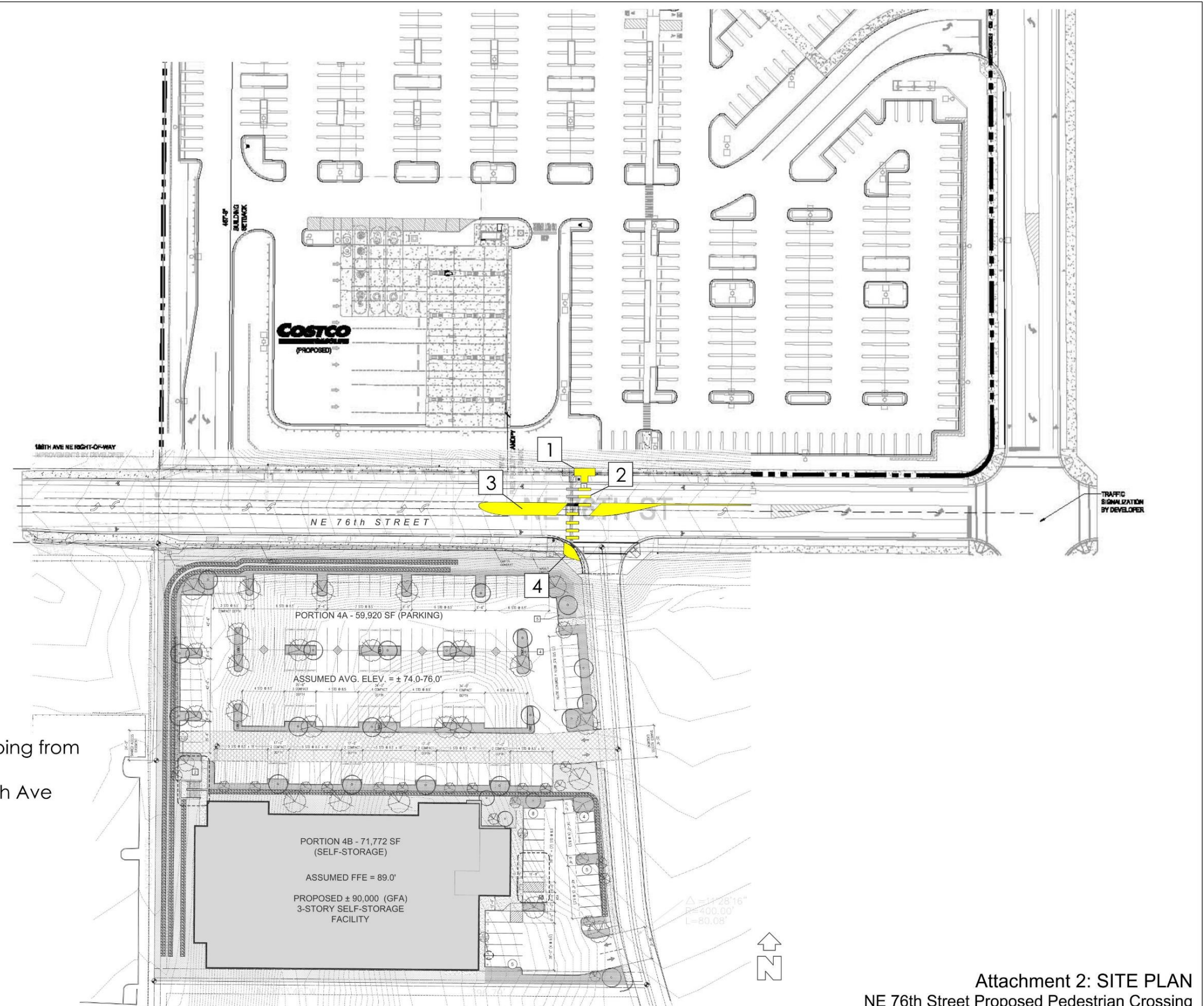
1 Proposed New Curb Ramp

2 Proposed Marked Crosswalk

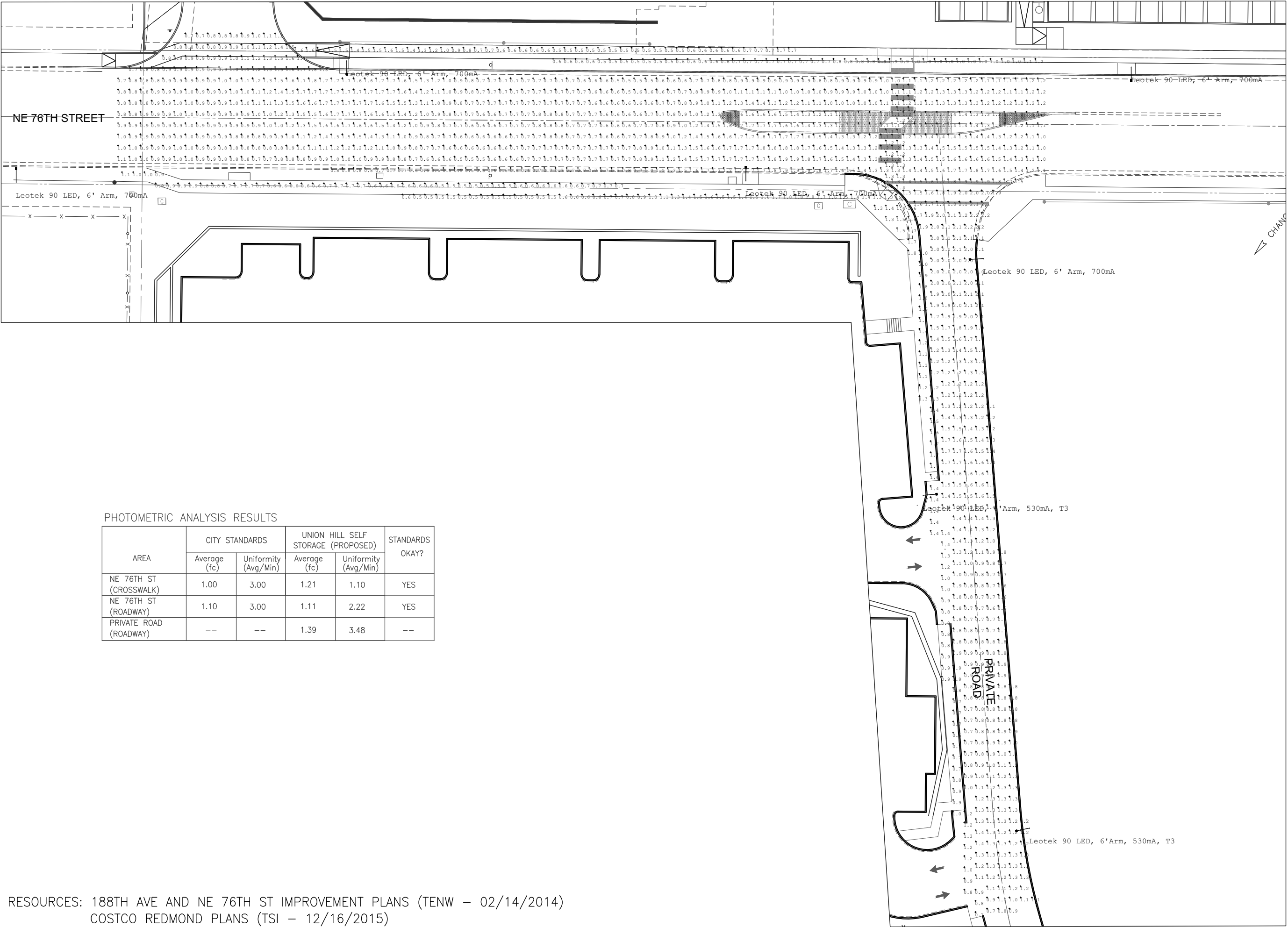
3 Modify Existing Median

- Create pedestrian refuge
- Trim, and remove 20' of landscaping from each side of the refuge
- Extend EB left turn pocket at 188th Ave

4 Modify Existing Curb Ramp



Attachment 2: SITE PLAN
NE 76th Street Proposed Pedestrian Crossing



PHOTOMETRIC ANALYSIS RESULTS

AREA	CITY STANDARDS		UNION HILL SELF STORAGE (PROPOSED)		STANDARDS OKAY?
	Average (fc)	Uniformity (Avg/Min)	Average (fc)	Uniformity (Avg/Min)	
NE 76TH ST (CROSSWALK)	1.00	3.00	1.21	1.10	YES
NE 76TH ST (ROADWAY)	1.10	3.00	1.11	2.22	YES
PRIVATE ROAD (ROADWAY)	--	--	1.39	3.48	--

RESOURCES: 188TH AVE AND NE 76TH ST IMPROVEMENT PLANS (TENW – 02/14/2014)
COSTCO REDMOND PLANS (TSI – 12/16/2015)

PROJECT

**UNION HILL
SELF STORAGE**

PROJECT NO. **16054**

DATE

11/11/2016

DRAWN BY

PRINCIPAL IN CHARGE

REVISIONS

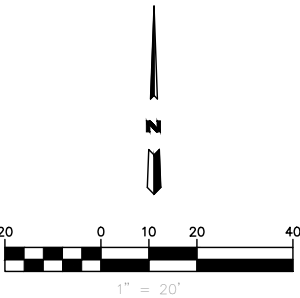
NO. DATE

DATE PLOTTED: _____

SHEET TITLE

**Photometric
Analysis**

SHEET NO.





LOCATION	SIGHTLINE MEASURED	STOPPING SIGHT DISTANCE		DECISION SIGHT DISTANCE	
		REQUIRED**	OKAY?	REQUIRED**	OKAY?
A	740 FEET	155 FEET	YES	445 FEET	YES
B	470 FEET	155 FEET	YES	445 FEET	YES

** LEGAL SPEED IS 25 MPH, PER FEEDBACK FROM REDMOND STAFF.

*** THE PHOTOS REPRESENT THE FIELD DECISION SIGHT DISTANCE MEASURES LOOKING TO THE "CONE".



Vehicle Speed Report Summary

Location: NE 76TH W/O 188TH AVE NE

Count Direction: Eastbound / Westbound

Date Range: 7/27/2016 to 7/27/2016

Site Code: 01

	Speed Range (mph)																	Total
	0 - 10	10 - 15	15 - 20	20 - 25	25 - 30	30 - 35	35 - 40	40 - 45	45 - 50	50 - 55	55 - 60	60 - 65	65 - 70	70 - 75	75 - 80	80 - 85	85 +	Volume
Study Total																		
Eastbound	2	4	5	31	128	437	597	322	63	7	3	2	0	0	0	0	0	1,601
Percent	0.1%	0.2%	0.3%	1.9%	8.0%	27.3%	37.3%	20.1%	3.9%	0.4%	0.2%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	100%
Westbound	1	9	9	59	210	526	423	140	16	5	0	0	1	0	0	0	0	1,399
Percent	0.1%	0.6%	0.6%	4.2%	15.0%	37.6%	30.2%	10.0%	1.1%	0.4%	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%	100%
Total	3	13	14	90	338	963	1,020	462	79	12	3	2	1	0	0	0	0	3,000
Percent	0.1%	0.4%	0.5%	3.0%	11.3%	32.1%	34.0%	15.4%	2.6%	0.4%	0.1%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	100%

Total Study Percentile Speed Summary				Total Study Speed Statistics			
Eastbound				Eastbound			
50th Percentile (Median)		36.5	mph	Mean (Average) Speed		36.4	mph
85th Percentile		41.7	mph	10 mph Pace		32.2 - 42.2	mph
95th Percentile		44.7	mph	Percent in Pace		68.3	%
Westbound				Westbound			
50th Percentile (Median)		33.7	mph	Mean (Average) Speed		33.8	mph
85th Percentile		38.9	mph	10 mph Pace		29.2 - 39.2	mph
95th Percentile		42.3	mph	Percent in Pace		69.2	%

Location: NE 76TH W/O 188TH AVE NE
 Date Range: 7/27/2016 to 7/27/2016
 Site Code: 01

Wednesday, July 27, 2016
 Eastbound

Time	Speed Range (mph)																	Total Volume
	0 - 10	10 - 15	15 - 20	20 - 25	25 - 30	30 - 35	35 - 40	40 - 45	45 - 50	50 - 55	55 - 60	60 - 65	65 - 70	70 - 75	75 - 80	80 - 85	85 +	
12:00 AM	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	2
1:00 AM	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
2:00 AM	0	0	0	0	1	2	0	0	1	0	0	0	0	0	0	0	0	4
3:00 AM	0	0	0	0	0	2	3	2	0	0	0	0	0	0	0	0	0	7
4:00 AM	0	0	0	0	0	3	3	2	1	0	1	0	0	0	0	0	0	10
5:00 AM	0	0	0	0	3	6	3	2	0	0	0	0	0	0	0	0	0	14
6:00 AM	0	0	0	2	4	14	17	1	1	0	0	0	0	0	0	0	0	39
7:00 AM	0	0	3	4	6	13	11	1	0	0	0	0	0	0	0	0	0	38
8:00 AM	0	0	0	0	4	13	5	5	1	0	0	0	0	0	0	0	0	28
9:00 AM	0	0	0	3	4	14	28	2	1	0	0	1	0	0	0	0	0	53
10:00 AM	0	1	1	0	7	16	15	9	1	1	0	0	0	0	0	0	0	51
11:00 AM	0	0	0	6	9	15	28	13	3	0	1	0	0	0	0	0	0	75
12:00 PM	0	0	0	2	8	16	33	16	3	1	0	0	0	0	0	0	0	79
1:00 PM	0	1	1	5	11	23	26	14	3	0	0	0	0	0	0	0	0	84
2:00 PM	0	0	0	5	9	28	32	14	1	2	0	0	0	0	0	0	0	91
3:00 PM	0	0	0	0	12	57	40	34	6	1	0	0	0	0	0	0	0	150
4:00 PM	1	1	0	1	6	44	87	45	13	0	0	0	0	0	0	0	0	198
5:00 PM	0	0	0	0	9	45	89	70	12	0	1	0	0	0	0	0	0	226
6:00 PM	0	0	0	0	9	46	81	51	7	1	0	0	0	0	0	0	0	195
7:00 PM	0	0	0	0	12	26	43	20	4	0	0	0	0	0	0	0	0	105
8:00 PM	1	0	0	2	9	17	21	10	2	0	0	0	0	0	0	0	0	62
9:00 PM	0	0	0	1	3	27	17	3	2	0	0	0	0	0	0	0	0	53
10:00 PM	0	1	0	0	1	7	11	5	1	1	0	1	0	0	0	0	0	28
11:00 PM	0	0	0	0	0	3	3	2	0	0	0	0	0	0	0	0	0	8
Total	2	4	5	31	128	437	597	322	63	7	3	2	0	0	0	0	0	1,601
Percent	0.1%	0.2%	0.3%	1.9%	8.0%	27.3%	37.3%	20.1%	3.9%	0.4%	0.2%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	

Daily Percentile Speed Summary			Speed Statistics	
50th Percentile (Median)	36.5	mph	Mean (Average) Speed	36.4 mph
85th Percentile	41.7	mph	10 mph Pace	32.2 - 42.2 mph
95th Percentile	44.7	mph	Percent in Pace	68.3 %

Location: NE 76TH W/O 188TH AVE NE
 Date Range: 7/27/2016 to 7/27/2016
 Site Code: 01

Wednesday, July 27, 2016
 Westbound

Time	Speed Range (mph)																	Total Volume
	0 - 10	10 - 15	15 - 20	20 - 25	25 - 30	30 - 35	35 - 40	40 - 45	45 - 50	50 - 55	55 - 60	60 - 65	65 - 70	70 - 75	75 - 80	80 - 85	85 +	
12:00 AM	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	2
1:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:00 AM	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	3
4:00 AM	0	0	0	2	0	2	3	3	1	0	0	0	0	0	0	0	0	11
5:00 AM	1	1	0	3	3	10	8	2	0	0	0	0	0	0	0	0	0	28
6:00 AM	0	1	3	4	15	29	18	4	3	0	0	0	0	0	0	0	0	77
7:00 AM	0	0	0	4	11	35	29	9	1	2	0	0	0	0	0	0	0	91
8:00 AM	0	5	0	10	48	109	84	18	1	0	0	0	1	0	0	0	0	276
9:00 AM	0	0	5	8	27	95	59	30	3	0	0	0	0	0	0	0	0	227
10:00 AM	0	1	0	2	15	31	30	5	0	1	0	0	0	0	0	0	0	85
11:00 AM	0	1	0	2	14	28	17	11	1	0	0	0	0	0	0	0	0	74
12:00 PM	0	0	0	4	10	15	20	3	0	0	0	0	0	0	0	0	0	52
1:00 PM	0	0	0	6	6	25	7	3	0	0	0	0	0	0	0	0	0	47
2:00 PM	0	0	0	3	7	22	18	5	0	0	0	0	0	0	0	0	0	55
3:00 PM	0	0	0	3	9	30	12	7	1	0	0	0	0	0	0	0	0	62
4:00 PM	0	0	0	2	14	31	23	11	0	0	0	0	0	0	0	0	0	81
5:00 PM	0	0	0	1	8	13	26	11	2	0	0	0	0	0	0	0	0	61
6:00 PM	0	0	1	0	6	8	27	6	2	0	0	0	0	0	0	0	0	50
7:00 PM	0	0	0	0	4	19	19	5	1	0	0	0	0	0	0	0	0	48
8:00 PM	0	0	0	2	8	11	8	2	0	0	0	0	0	0	0	0	0	31
9:00 PM	0	0	0	2	2	8	13	2	0	1	0	0	0	0	0	0	0	28
10:00 PM	0	0	0	0	1	3	1	2	0	1	0	0	0	0	0	0	0	8
11:00 PM	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	2
Total	1	9	9	59	210	526	423	140	16	5	0	0	1	0	0	0	0	1,399
Percent	0.1%	0.6%	0.6%	4.2%	15.0%	37.6%	30.2%	10.0%	1.1%	0.4%	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%	

Daily Percentile Speed Summary			Speed Statistics		
50th Percentile (Median)	33.7	mph	Mean (Average) Speed	33.8	mph
85th Percentile	38.9	mph	10 mph Pace	29.2 - 39.2	mph
95th Percentile	42.3	mph	Percent in Pace	69.2	%



Countermeasure Selection Tool

Name of location: NE 76th Street Midblock (185th-188th Ave NE) Redmond, WA

Your Performance Objective: Improve Pedestrian Access and Mobility

Site Description Answers:

Type of Area: Suburban

Functional Class: Collector or Minor Arterial

Intersection or Midblock: Midblock

Volume: Medium ($\geq 10,000$ and $\leq 25,000$ ADT)

Speed: Low (≤ 45 mph)

No. of Lanes: 2 or fewer lanes

Traffic Signal: Not present (Installation is not an option)

Transit Line/Route: No, the roadway is not on a transit line/route.

School Zone/Crossing: No, the roadway is not in a school zone or a school crossing.

Railroad Crossing: No, the roadway does not contain a railroad crossing.

Work Zone: No, the roadway is not in a work zone.

Based upon your input, the following countermeasures were found:

Along the Roadway

Sidewalk/Walkway

-Sidewalks are existing. Walkways are provided internally on the Costco and Costco Employee parking lot sites.

At Crossing Locations

Curb Ramp

-Curb ramps to meet ADA guidelines.

Pedestrian Crossing Island

-Pedestrian refuge island proposed with modifications to landscaping in center median.

Crosswalk Enhancement

-An Enhancement feature(s) to be considered.

Transit

Transit Stop Treatments

-NE 76th Street is not a designated transit route.

Roadway Design

Raised Median

-Pedestrian refuge island proposed with modifications to landscaping in the center raised median.

Driveway Improvements

-Driveway is restricted to right-in/right-out with median.

Traffic Calming

Choker

-Choker not considered and raised crossing traffic calming features were not considered due to Cadman trucks and other delivery trucks in the area (through street is not a truck identified as a truck route).

Traffic Management

Partial Street Closure

-A partial street closure not reasonable for this area.

Signals and Signs

Pedestrian Hybrid Beacon (HAWK)

-A HAWK was not considered; however, a RRFB would be considered given the measured vehicle speeds and employee start times (4 am when it is dark)

Other Measures

Work Zones - Pedestrian Detours

-Work zone detours will be made available when applicable.

School Zone Improvement

-The location is not in a school zone.

[Start Over](#)[Save Results to Excel](#)



warehouse (near a major walkway internal to the Costco site) or to the fueling station (located just west of the crossing). Other treatment options, not considered, that were reviewed include:

- Locating the crossing at Costco's NE 76th Street driveway requires pedestrians to cross an unprotected (no center median) area of NE 76th Street. Furthermore, the Costco driveway is full access at this location.
- A choker was considered; however, based on the recently completed NE 76th Street we decided that the center median was a reasonable feature for this roadway. In addition, the choker would extrude the curb at the crossing point to reduce the crossing width. This would require some redirection of truck and vehicle paths and also rework of the bike lane features through the choker point which did not seem reasonable.

Other alternative reviews are based on information from Issaquah Pedestrian Crossing Study, prepared by TSI October 2015. Resources include: *Safety Effects of Marked Versus Unmarked Crosswalks at Uncontrolled Locations Final Report and Recommended Guidelines*, Publication Number: FHWA-HRT-04-100, September 2005; *City of Sacramento Pedestrian Crossing Guidelines*, 2014; and *Pedestrian Safety Guide and Countermeasure Selection System*, PEDSAFE, 2013.

- Given: The crossing conditions include a three lane section with a median (crossing one lane at a time); an ADT between 12,000 and 15,000; sufficient street lighting; warehouse employee shifts start as early as 4 AM; sight distance meets city standards; a legal speed of 25 mph; measured 85th-percentile speed of 41.7 mph eastbound / 38.9 mph westbound (with an incorrectly posted 35 mph speed) and there no significant crash history in the area.
- FHWA-HRT-04-100. Data is not specific on for a two lane roadway with a raised median. The data supports a marked crossing. Existing measured vehicle speeds are above or near 40 mph in both directions; and pedestrian facility enhancements in addition to a marked crosswalk are recommended.
- Sacramento Guidelines. Our findings are similar to FHWA-HRT-04-100 recommendations.
- PEDSAFE. A copy of the PEDSAFE Countermeasure output is attached for reference (Attachment 6). PEDSAFE recommends a crosswalk enhancement, with curb ramps and a pedestrian crossing island is preferred. PEDSAFE recommends a HAWK signal.

23) Traffic Safety Committee Input (optional)

Not required

24) List of Attachments (please attach any relevant drawings, photographs, data, and calculations)

1. Vicinity Map
2. Site Plans (Costco and Self-Storage)
3. Photometric Analysis
4. Sight Distance Field Measures
5. Speed Study
6. PEDSAFE Worksheet

25) Findings and Recommendation (of the reviewer)

- Provide marked midblock crossing of NE 76th Street at the west side of the existing private driveway on the south side of the street.
- Crosswalk is recommended to be slightly offset from west to east across NE 76th Street.
- Modify the existing landscaped central median to create a pedestrian refuge area.
- Clear landscaping, within the central median, to 20 feet beyond the pedestrian refuge area.
- Provide advance signage to identify the proposed crossing.
- Consider installation of a pedestrian actuated rectangular flashing beacon systems to support crossing maneuvers.

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